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# Effect of Extended Teo Strut Graft on Tip Rotation and Projection in Open Rhinoplasty: A Case-Series Study

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**Abstract** **Background:** Nasal tip position is critical for optimal rhinoplasty outcomes, yet managing rotation and projection is challenging in patients with short caudal septa or ptotic tips. The Teo Strut Graft (TSG) enhances tip support. **Objective:** To present an extended TSG technique using Tongue-In-Groove (TIG) fixation to improve tip position in primary open rhinoplasty. **Methods:** This prospective case series enrolled 38 primary rhinoplasty patients presenting with ptotic tips and/or short septal anatomy from March 2021 to June 2023. Patients underwent open rhinoplasty by a single surgeon, involving placement of an extended TSG (septal cartilage), fixed via the TIG method. Standardized lateral photographs were assessed preoperatively and immediately postoperatively and the nasolabial angle (NLA) and Goode's ratio tip projection were quantified at one year. **Results:** The mean preoperative NLA significantly increased from 83.62±8.01° to 103.45±7.37° at one year postoperatively ($p<0.001$). Mean Goode's ratio increased considerably from 0.634±0.055 preoperatively to 0.714±0.061 at one year ($p<0.001$). One-year NLA was stable ($p = 0.18$ vs immediate postoperation). At the same time, projection showed a minor, significant decrease from immediate postoperation ($p = 0.013$) and remained significantly improved than baseline ($p<0.001$). **Conclusions:** The extended TSG effectively increased NLA and nasal tip projection in patients with ptotic tips and short septum, yielding largely stable one-year results.

**Key Words** Rhinoplasty, Nasal Tip Ptosis, Tip Rotation, Tip Projection, Teo Strut, Septal Extension Graft

## INTRODUCTION

A well-defined and adequately supported nasal tip is essential for achieving an aesthetically balanced nose and satisfactory rhinoplasty outcomes. The ptotic (drooping) nasal tip deformity represents cosmetic concern and contributes to functional nasal obstruction. Static (weak cartilaginous support and short septum) and dynamic factors (depressor septi nasi muscle activity) play a role in tip ptosis [1]. Achieving and maintaining the desired tip rotation (nasolabial angle; NLA) and projection over time remain challenging aspects of rhinoplasty [2]. Standard manoeuvres often disrupt native tip support mechanisms, risking postoperative tip droop if not adequately reconstructed [2,3]. The challenge is exacerbated in patients with a congenitally short caudal septum with limited cartilage length to support or elongate the tip. In such cases, a simple columellar strut graft may provide only minimal or short-lived improvement, as the strut has little stable support on a short septal base [3].

Multiple techniques have been developed to augment tip support and counteract tip ptosis. Columellar strut grafts placed between the medial crura can buttress the tip. Still, they often do not significantly increase tip projection by themselves and may not prevent long-term tip drop [3,4]. In contrast, septal extension grafts (SEGs), anchored to the caudal septum, effectively controlled the tip position. By overlapping and extending the septum, SEG can set the tip at a new rotation and projection and maintain it by rigid fixation to the septum [5]. Clinical studies have demonstrated that SEGs provide superior long-term tip stability compared to columellar struts [6,7]. A recent retrospective comparison study found that at one year post-rhinoplasty, patients with SEGs had no loss of tip projection and minimal (~1°) loss of rotation.

In contrast, those with columellar struts showed measurable decreases in both [7]. These findings underscore the importance of robust septal-based support for lasting tip

elevation. However, traditional SEG is difficult in patients with a short or deficient septum as there may be insufficient caudal septal length or cartilage stock to secure an extension graft. In such conditions, surgeons have devised modifications, like floating or hinged struts and composite grafts, to achieve tip support but consensus on the optimal approach remains debated [8].

Teoman Dogan introduced the Teo Strut Graft (TSG) in 2023 as part of a minimalist rhinoplasty philosophy aimed at maximizing tip support with minimal tissue disruption. The TSG is designed with a triangular configuration, wider at its base and tapering to a narrow apex [9], unlike the rectangular blocks used in classic SEGs [10]. This design provides a strong base that contacts the septum, while the narrowed apex fits beneath the tip cartilages to support them without excessive rigidity [2]. Dogan's technique fixes the graft to the tip-defining points, effectively integrating the lower lateral cartilages with the septum as one unit [9]. A similar strategy reconstructing a robust yet flexible central nasal support helps maintain long-term tip projection and rotation [2].

Building on this concept, we aimed to develop an extended TSG technique to address patients with drooping tips and short septal anatomy specifically. Also, we modified Dogan's original approach [9] by securing the triangular cartilage strut to the intermediate crura (dome region) and anchoring it using a Tongue-In-Groove (TIG) method to the caudal septum. Adding the TIG fixation, which sutures the medial crura to the septum/graft complex, provides further stability and precise control of tip position. Unlike the original Teo strut, our modification aimed to extend the graft caudal to the caudal edge of the septum.

## METHODS

### Study Design and Setting

A prospective, quasi-experimental case series study was used to evaluate the extended Teo strut technique in primary rhinoplasty. Patients presenting with ptotic tips and/or short septal anatomy were enrolled via convenience sampling. Among the 43 patients selected, 5 missed the follow-up and the remaining 38 patients were enrolled in the study. All procedures were performed by a single surgeon at Sulaimani Burn, Reconstructive and Plastic Surgery Hospital and Royal Private Hospital, Sulaimaniyah, Iraq, from March 2021 to June 2023.

### Sample Size Calculation

A general formula for calculating sample size was used as:

$$n = \frac{Z^2 \cdot p \cdot (1-p)}{E^2}$$

where, n = sample size, Z = Z-score (95% confidence), p = estimated proportion (0.5) and E = margin of error (0.05 for a 5% margin).

### Inclusion Criteria

A drooping nasal tip (NLA <90° in males or <95° in females, with a visually ptotic tip) and/or a short septum with inadequate tip support (reduced columellar-to-lip distance and difficulty achieving tip rotation with sutures alone). Those that had primary (first-time) rhinoplasty with the availability of standardized profile photographs both preoperatively and at least 12 months postoperatively.

### Exclusion Criteria

Patients requiring major dorsal reconstruction or severe septal deviations necessitating extracorporeal septoplasty and revision rhinoplasty cases.

### Surgical Technique

We performed all procedures via an open rhinoplasty approach under general anaesthesia. After performing dorsal hump reduction or modification, we turned attention to the nasal tip and then the extended TSG was employed as follows:

- **Cartilage Harvest:** Septal cartilage was the preferred donor material for the strut graft. We harvested a strip measuring ~20-25 mm long and 10-15 mm wide from the posterior septum or inferior septal angle, ensuring that at least a 10 mm dorsal and caudal septal L-strut was preserved for structural support. Then, this strip was carved into a triangular cross-section, thicker at the base (2-4 mm) and tapering toward the apex (1-2 mm). The final graft measured 13-20 mm in length and 10-13 mm in width (Figure 1). Maintaining a thicker base with a tapered tip provided the necessary rigidity at the septal attachment while preserving flexibility at the nasal tip, consistent with the original Teo strut concept
- **Placement:** We positioned the extended TSG unilaterally along the caudal septum. The choice of side (left or right) was based on the patient's tip dynamics and overall nasal anatomy; we often favored the concave side of any septal deviation or whichever side best corrected tip asymmetry. This approach was especially critical in patients with a short septum, who commonly exhibit a ptotic tip due to inadequate support. After customizing the graft, the ideal fixation point to achieve the desired tip rotation and projection was determined. Once the correct orientation is confirmed, position the graft along the septum with its tapered end beneath the dome. Then, deliberately advanced the graft 1-3 mm caudal to the septum's natural edge and extended it anteriorly to the anterior edge. This modification enhanced tip support by providing a robust anchor for the medial crura and allowed controlled adjustment of tip projection and the tip-breaking point
- **Fixation:** The strut was anchored to the caudal septum in a side-to-side manner using 6-0 Prolene horizontal mattress sutures (Figure 2). Typically, three sutures secured the graft to the septum, thereby minimizing the risk of graft instability. Subsequently, we secured the graft's free (caudal) end to both medial crura using a TIG suture technique (Figure 3), which enhanced tip support and created a smooth contour. Following this, a figure-of-eight suture was placed for internal fixation; once the internal stitch was applied, we wrapped its free ends

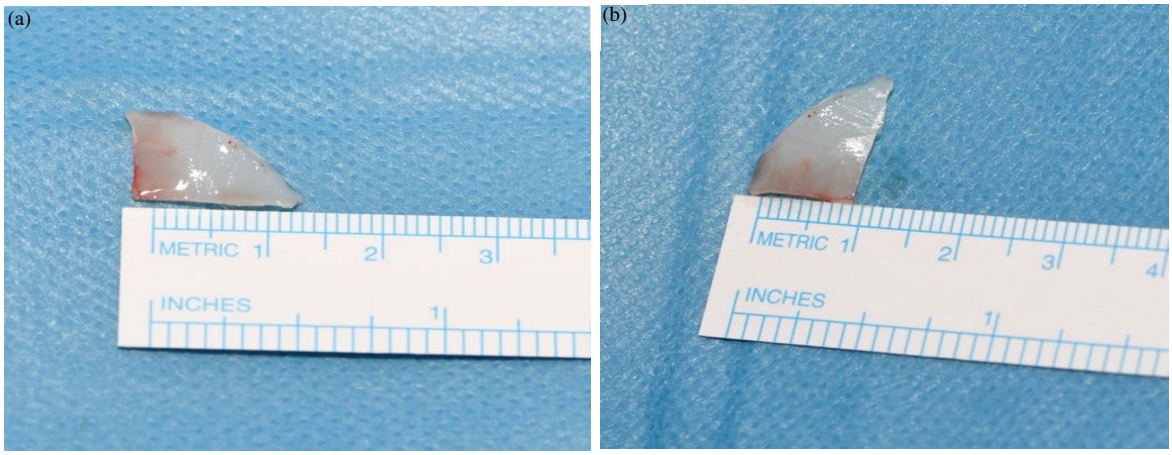


Figure 1(a-b): Extended Teo Strut Graft Dimensions, Showing Measurements of (a) Length and (b) Width

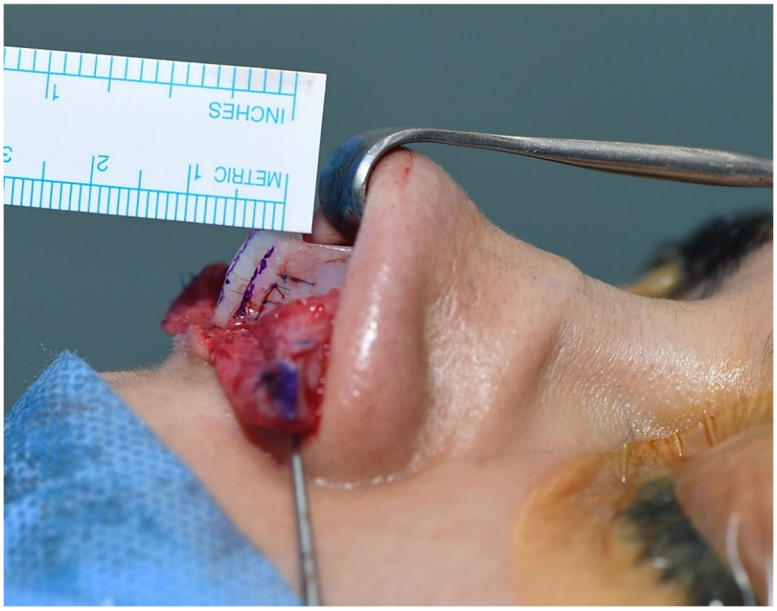


Figure 2: ETSG advanced 3 mm caudally and fixated to the septum with three 6-0 polypropylene mattress sutures

Figure 3: Tongue-in-groove suture securing both medial crura to the graft

around the apex of the strut, securing both domes to the graft. Then, two additional loop sutures were added for extra stability. With the apex carved thinner, the tip retained flexibility when moved cephalically yet remained resistant to caudal displacement; effectively preventing tip droop. Final tip definition was achieved with interdomain or other tip sutures as needed to ensure symmetrical dome positioning and robust tip support

- **Adjuncts:** Where indicated, a cephalic trim of the lateral crura was performed to address tip bulbosity. Additional lateral crural steal or spanning sutures may have been employed to refine tip projection and rotation further. Then, the septum was evaluated for residual deviations and minor deflections were corrected to maintain a straight strut and aligned columellar. Finally, the incisions were closed and standard postoperative taping was done along with an external splint and internal nasal splints for 10 days

### Outcome Measurements

**NLA:** The NLA was measured on standardized profile photographs as the angle formed at the subnasale by two lines; one drawn from the subnasale to the columellar apex (columellar point) and the other from the subnasale to the labiale superius [11]. A single investigator performed all measurements using the protractor feature in Image-J (NIH) software [12]. The ideal female NLA was often cited as ~100-110° and 90-105° for males [11], so postoperative NLAs within this range were considered aesthetically favourable.

**Nasal Tip Projection:** The tip projection was quantified using Goode's method [13], which is the ratio of the distance from the nasal tip to the nasion (or alar root, as per the method) divided by the total nasal length. Goode's ratio is typically reported to be ~0.55-0.60 [13], although this cohort's baseline value was higher (0.68), likely reflecting distinct facial proportions. We obtained measurements preoperatively, immediately postoperatively and at one year using standardized profile photographs and analyzed changes based on relative differences rather than an absolute ideal value.

**Photographic Standardization:** Profile photographs were obtained with patients in a natural head position, 1.5 m from the camera, under consistent lighting and distance settings. All pictures were taken by a single individual using identical camera settings. We reproduced the same camera angle and patient posture at a one-year follow-up. We avoided any smile or animation during these photographs to ensure accurate angle measurement. All images were calibrated against a ruler for scale in Image-J to allow distance measurements for projection calculations.

### Statistical Analysis

Data analysis was done using Statistical Package for Social Science (SPSS, IBM Corp, USA, version 26). Descriptive statistics (mean, standard deviation and range) were computed for key variables (NLA and tip projection) at each time point. Paired t-tests were used to compare preoperative versus immediate postoperative values and immediate postoperative versus one-year values. Because the differences between the immediate postoperative and one-year measurements were minimal, the Wilcoxon signed rank test was applied to confirm no significant median shift. An Independent-sample t-test was used for subgroup comparisons (females vs. males, right vs. left strut placement). Pearson or Spearman correlation analyses were done to assess relationships among changes in angle/projection. A $p<0.05$ was considered significant and a $p<0.001$ as highly significant.

## RESULTS

### Patients' Characteristics

Among 38 patients, 89.5% were females with a mean age of 23.7±6.7 years (ranging from 18-48). The mean preoperative NLA was 83.62±8.01° (84% had an NLA <90°) and the mean tip projection (Goode's ratio) was 0.634±0.055 (Table 1). Six patients (16%) had a short nose (mean NLA 105°) and inadequate septal length determined intraoperatively. Cartilage for the extended Teo strut was exclusively harvested from the septum and placed on the right in 35 patients and the left in three, with all patients undergoing additional refinement manoeuvres during the operative time (2.5-3.5 hours) and no intraoperative complications were recorded.

### Early Postoperative Outcomes

Paired t-tests indicated a significant increase from preoperative to immediate postoperative measurements for NLA and tip projection ($p<0.001$). Immediately post-surgery (before splinting), the NLA rose to 104.21±7.43° (a mean gain of ~20.6°, $p<0.001$), with 89% achieving gender-specific ideal values (females ~105°; males ~98°). The mean tip projection improved to 0.724±0.053, reflecting a mean gain of ~0.09 ($p<0.001$). Strong positive correlations were observed between preoperative and immediate postoperative values for both NLA ($r = 0.620$, $p<0.001$) and tip projection ($r = 0.558$, $p<0.001$) (Figure 4).

### One-year stability

At a mean follow-up of 13.5 months (ranged from 8-24), the mean NLA was 103.45±7.37° ($p = 0.18$ vs. immediate) and tip projection was 0.714±0.061 ($p = 0.013$ vs. immediate). While this slight decrease in tip projection (-0.010) reached a significance level, the net improvement relative to the preoperative value remained large ($p<0.001$ for both NLA and projection vs. preoperative) (Figure 4).

Spearman's correlations confirmed high stability between immediate postoperative and one-year measurements ($r = 0.949$ for NLA and $r = 0.917$ for projection ($p<0.001$). No tip ptosis recurrence or functional compromise was noted; nasal breathing improved or remained stable subjectively (Figure 5).

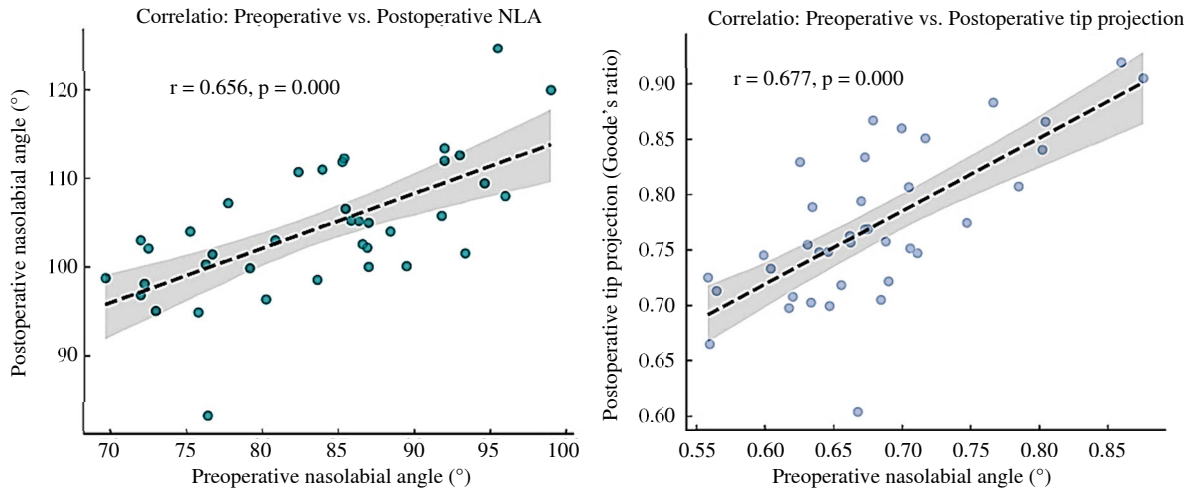
Correlatio: Preoperative vs. Postoperative NLA
r = 0.656, p = 0.000
Postoperative nasolabial angle (°)
Preoperative nasolabial angle (°)
Correlatio: Preoperative vs. Postoperative tip projection
r = 0.677, p = 0.000
Postoperative tip projection (Goode's ratio)
Preoperative nasolabial angle (°)

Figure 4(a-b): (a) Scatter plot of preoperative vs. immediate postoperative nasolabial angle, showing strong positive correlation (r = 0.656, p<0.001) and (b) Scatter plot of preoperative vs. immediate postoperative Goode's ratio, showing significant positive correlation (r = 0.589, p<0.001)

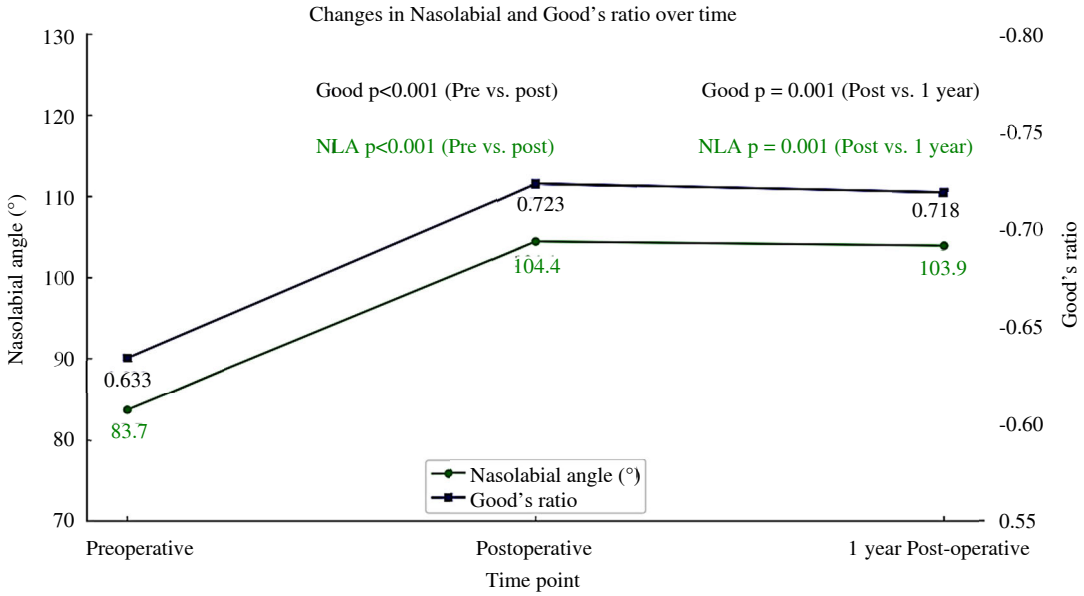


Figure 5: Longitudinal changes in nasolabial angle (NLA) and nasal tip projection (Goode's ratio) following rhinoplasty with the extended TSG

Green and navy lines represent mean values for NLA and Goode's ratio, respectively, recorded preoperatively, immediately postoperatively and at one-year follow-up. Both parameters demonstrated significant improvement postoperatively (p<0.001), with sustained outcomes at one year. Minor regression in tip projection was noted (p = 0.013), while NLA remained stable (p = 0.18)

Table 1: Demographic and surgical characteristics of the study cohort

| Variable | Range | Mean+SD |
|---|---|---|
| Age (Years) | 18-48 | 23.68+6.72 |
| Follow-up duration (Months) | 10-24 | 13.61+3.76 |
| Graft Advancement (mm) | 1.0-3.0 | 1.76+0.54 |
| Graft Length (mm) | 13-20 | 15.76+3.17 |

**Subgroup Analysis**

No significant differences in outcomes were observed based on graft placement side (right vs. left: mean NLA change 21° vs. 19°, p = 0.67), gender (NLA change: p = 0.115; tip projection change: p = 0.940) or graft width (ANOVA, p>0.40 for both NLA and projection changes). Multivariable regression did not identify any independent predictors of postoperative NLA or tip projection change (p>0.05). Subgroup comparisons of NLA and tip projection (Goode's ratio) changes across gender and TSG placement side using a dual-axis boxplot. No significant differences were observed across subgroups for either parameter (p>0.05) (Figure 6).

Finally, all postoperative improvements (preoperative to immediate) were highly significant (paired t-test, p<0.001). The difference from immediate postoperative to one-year was not significant for NLA (p = 0.18) but significant (p = 0.013) for tip projection, though small (~0.010), indicating overall stable outcomes (Table 2 and Figure 7-8).

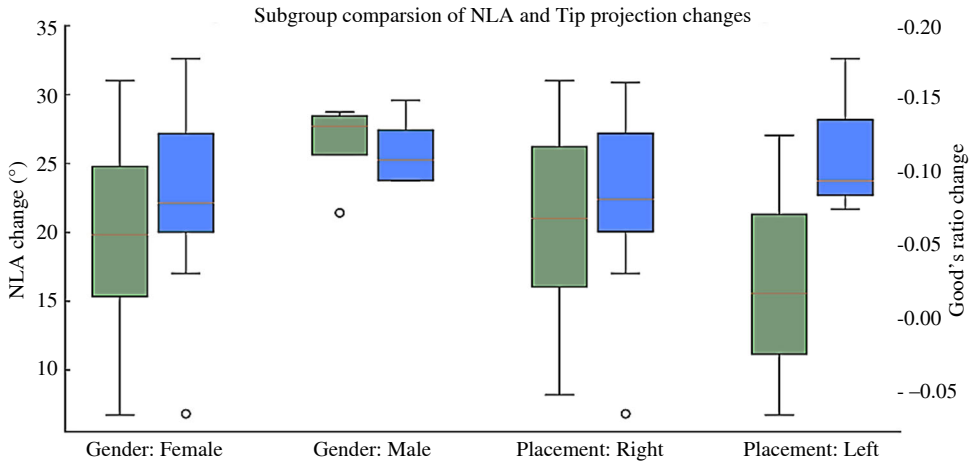


Figure 6: A dual-axis boxplot compares changes in the nasolabial angle (light green, left axis) and tip projection (Goode's ratio; blue, right axis) across gender and the TSG placement side
No significant subgroup differences were found (p>0.05)

Figure 7(a-f): Clinical photographs of a studied patient. Preoperative frontal and lateral views showing (a, b) A drooping tip and reduced nasolabial angle, (c, d) Immediate postoperative image demonstrating improved tip rotation and projection and (e,f) One-year follow-up confirming the durability of the surgical outcome

Figure 8(a-f): Clinical photographs of a studied patient. Preoperative frontal and lateral views showing (a, b) A drooping tip and reduced nasolabial angle, (c, d) Immediate postoperative image demonstrating improved tip rotation and projection and (e, f) One-year follow-up confirming the durability of the surgical outcome

Table 2: Presents Descriptive Statistics for Nasal Tip Outcome Measures (NLA and tip Projection) at Preoperative, Immediate Postoperative and One-Year Postoperative Time Points

| Outcome Measure | Preoperative | Immediate Postoperative | One-year Postoperative | p-value (Pre vs. Immediate) | p-value (Immediate vs. One-year) |
|---|---|---|---|---|---|
| | Mean±SD Range | | | | |
| Nasolabial Angle (degree) | 83.62±8.01° ~69-99 | 104.21±7.43° ~83-124 | 103.45±7.37° ~84-120 | <0.001** | 0.18 |
| Tip Projection (Goode's Ratio) | 0.634±0.055 0.50-0.80 | 0.724±0.053 0.60-0.85 | 0.714±0.061 0.58-0.87 | <0.001** | 0.013 |

**Highly significant difference, using paired t-test

## DISCUSSION

In this prospective series of 38 patients with a short septum and drooping (ptotic) nasal tip, the extended TSG consistently improved tip rotation and tip projection. On average, there was a ~20° increase in the NLA, bringing most patients into an aesthetically favourable range substantially higher than the modest, often diminishing gains reported with standard rhinoplasty techniques lacking an extension graft [4,14]. Rotation was maintained mainly at one year (about 0.5° of settling), indicating strong structural stability. Tip projection similarly increased from 0.633 to ~0.723. It remained stable (0.714) at one year, suggesting that augmenting short-septum noses with an extended Teo strut can reliably correct tip ptosis while preserving function with no adverse effects on the airway recorded.

Şirinoğlu et al. found that using a short columellar strut with a septo-columellar suture yielded an initial increase in rotation. Still, some of that was lost as the support was not rigid [15]. Other studies have shown that SEGs offer more reliable, long-term rotation control than floating struts,

which can pivot or slide [6]. In contrast, SEGs act as an extension of the septal L-strut, directly dictating tip position. In this regard, Harel *et al.* [5] reported a mean +7.4° increase in NLA at one year using SEGs in endonasal rhinoplasty. Our rotation gain was nearly double this, likely because our patients started with more severe ptosis (lower baseline NLA) and, thus, had more room for improvement. Importantly, our graft prevented tip recoil, as evidenced by the stable angles at one year. Similarly, Aldosari *et al.* [6] found tip rotation was more stable with SEG long-term, whereas strut-supported tips tended to drop noticeably between 6-18 months. Our findings reinforce the consensus that a solid septal-based graft is superior in maintaining tip rotation over time.

Although an earlier study on nasal tip projection by Sinno *et al.* [16] identified an ideal Goode's ratio of 0.55-0.60 in young white women, our findings support an ideal value of ~0.67±0.05, defining a normal range of roughly 0.62 to 0.72. In this cohort, the preoperative mean ratio of 0.63±0.06 was therefore within this acceptable range; however, the significant postoperative increase to around a mean of 0.72 (mean value at one year was 0.714) not only augmented the numerical value but also correlated with an upward reorientation of the tip. This dual improvement corrected the visual impression of ptosis, yielding a more harmonious and aesthetically pleasing nasal profile. Moreover, recent AI-based analyses of ideal nasal tip projection across diverse populations underscore that traditional benchmarks derived primarily from Caucasian noses may not be universally applicable and that a two-thirds (~0.67) ratio better accommodates anatomical variability [17]. These results underscore that successful tip correction is multifactorial; it is not merely about reaching a numerical ideal but also about establishing the proper spatial relationships and structural support, especially in patients with short septal anatomy and drooping tips. By bridging older aesthetic standards with current insights, our data advocate for a more refined benchmark that considers quantitative measures and the unique anatomical features of diverse patient populations.

The literature confirms the benefit of structural grafts in preserving projection. Bellamy and Rohrich [7] observed no projection loss at one year with caudal extension grafts, versus nearly 5% loss with struts. Sazgar *et al.* [18] examined adding a SEG to a TIG technique and found it maintained projection and rotation better than TIG alone, while this study effectively implements that a TIG combined with an extended graft holds it.

The extended Teo strut is a hybrid of a SEG and a traditional columellar strut. Extending the graft caudal to the caudal edge of the septum achieves a rigid support base (like an SEG), resisting posterior and inferior tip movement [14]. At the same time, it spans into the columellar and is sutured in a TIG manner, supporting the medial crura and shaping the columellar. One key design element is its triangular shape, as emphasized by Dogan [9]. Its broader base distributes forces at the septum, preventing buckling and the tapered apex near the tip preserves some flexibility. In other words, the graft is firm where it needs to be and forgiving where it should be, addressing concerns about extension grafts producing a stiff or unnatural tip [2]. Our patients maintained normal tip mobility, aligning with Dogan's observation [9] that the Teo strut bends slightly with tip movement.

Biomechanically, the strut creates a reinforced tripod that replaces the central leg with more substantial support and firmly attaches the medial crura via TIG sutures. This reduces reliance on less predictable soft tissue forces and minimizes tip descent due to scar contracture. Although TIG alone is powerful for drooping tips, short septum patients may lack enough septal length to secure robust rotation. Antunes and Quatela [14] showed TIG alone could lose 7-8° of rotation by one year. By extending the graft beyond the native septal margin, our technique lengthens the septal framework and creates a substantial overlapping junction with the remaining L-strut. These outcomes are consistent with Jeong [19] recommendation of a 3-4 mm overlap to maximize stability. Furthermore, as highlighted by Robotti [20], while the long-term effects on tip rotation may be similar between TIG alone or combined with a SEG offers the advantage of adjustability in height and angulation. This adjustability allows the surgeon to fine-tune tip projection for optimal aesthetic outcomes and enhanced resistance to postoperative tip ptosis [20].

Our modification shares similarities with several established methods used for a ptotic tip and short septum but also provides distinct advantages, like a classic SEG that extends the caudal septum and offers strong tip support [8]. However, instead of a rectangular piece requiring multiple sutures, our triangular single-piece graft seamlessly integrates with the columellar using only 2 to 3 sutures and columellar strut with TIG (without septal extension). This technique managed moderate tip ptosis, effectively suturing the medial crura to the septum with a small intervening strut. Giacomini *et al.* [1] used TIG in 87.8% of their drooping tip cases, with only 19.5% using a columellar strut, indicating a preference for septal-based support in severe cases. They achieved good rotation initially but likely did not have as rigid support as an extension graft would provide. Our series used a columellar strut extended and fixed to the septum and medial crura, bridging the gap between a free strut and an SEG. The outcomes favour having that rigid support. Atighechi *et al.* [21] showed that TIG alone increases resistance to tip displacement compared to a free strut and our approach amplifies this effect by anchoring a graft to a septum that supports suturing to the septum (as TIG does) is superior to an unattached strut. Our technique effectively enlarges the septum with the graft; thus, it is reasonable that patients had even more stable tips than would be seen with TIG on a short native septum.

Several alternative techniques have been proposed for managing short septum cases, each with advantages and limitations. A relatively new technique described for short septum is the inverted T-shaped columellar strut, a graft shaped like a "T" to stabilize short septum cases [22]. That graft has a horizontal component to latch onto whatever

septum exists. The extended Teo strut differs in that it is a single vertical piece; however, our use of the TIG sutures serves a similar purpose to the top bar of a T by securing to the septum and spreading the load. Another innovation is the hinge strut recently reported in Latino noses. This is a different concept: a bendable segmented graft placed to support the tip showed improved NLA at 6 months [8]. While promising, the hinge strut technique's long-term efficacy of <6 months isn't yet known.

In contrast, our extended strut aims to preserve and protect the correction for the long term. At 6 months, our patients already showed maintenance and at 12 months, they remained stable, which is encouraging for permanent change. It would be interesting in the future to compare these newer techniques head-to-head or in different patient populations.

This case series lacks a control group, limiting our ability to compare the extended Teo strut to alternative methods directly. Though our complication rate was low, improper trimming could lead to rigidity or visibility. Thus, broader adoption requires sufficient training, including cadaver practice. One-year follow-up is standard but not truly long-term. Although SEG studies suggest lasting stability, slight tip changes may occur over several years due to gravity and ageing. Variable concomitant manoeuvres (e.g., dorsal reduction, lateral wall treatment) may affect perceived nasal length. We minimized variability in the tip technique and used angles/ratios to standardize measurements. Because no other manoeuvre consistently increases NLA or projection, changes observed are still attributable primarily to the graft.

Despite these limitations, the findings from this series are clinically significant. Patients with a drooping, under-supported tip, especially those with short septal cartilage (common in specific ethnic populations or simply as an anatomic variation), can be challenging to correct with conventional methods. The extended TSG provides a reliable solution to achieve the desired tip rotation and projection and, crucially, to maintain those changes over time. This reduces the risk of the relapsing ptotic tip, where a nose might look great right after cast removal but the tip falls months later, necessitating revision. By using this technique, surgeons can feel more confident that the tip position they create in the OR will be the tip position that endures. From a patient's perspective, this means more predictable and stable results.

Multi-center studies could confirm these findings in diverse populations and randomized trials comparing the extended Teo strut to other tip-support methods would be ideal. Such data could objectively confirm the added rigidity from the extended graft and long-term (>5 years) follow-up can confirm stability and rule out late complications.

## CONCLUSIONS

The extended TSG offers an effective means to enhance and sustain tip rotation and projection for patients with a drooping nasal tip and short septum. Anchoring a triangular graft caudal to the septum and using TIG fixation provides reliable tip support with minimal loss of correction over time. This approach effectively counters tip droop, yields stable aesthetic results and preserves normal tip mobility. While further comparative research is desirable, combining septal extension and columellar strut concepts in a single graft design can reduce postoperative tip relapse and improve outcomes in challenging short-septum anatomies. We hypothesize that this combined approach can significantly increase tip rotation and tip projection while maintaining those improvements at long-term follow-up.

## Acknowledgement

The authors thank the surgical teams for their invaluable assistance. Special gratitude is extended to Dr. Teoman Doğan for pioneering the Teo Strut concept, which laid the foundation for this technique.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Ethical Considerations

This study was conducted with approval from the Kurdistan Higher Council of Medical Specialties (No. 4573 on April 20, 2023). All participants provided written informed consent for surgery, photography and the use of their data for research and publication. Patient anonymity was strictly preserved throughout data handling. The study adhered to the principles of the Declaration of Helsinki and all applicable guidelines for research involving humans.

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